

## Registrant Questions

November 19, 2020

### STEM-NET: Applications in Artificial Intelligence/Machine Learning Webcast

1. What are existing programs in the CSU that teach AI/Machine Learning?
  - a. Cal Poly SLO's Computer Science program has 5 undergraduate (CSC 480/1/2, 466, 487) and 3+ graduate classes (CSC 580/1/2; CSC 570 Select Topics) on AI, plus a few courses in our Data Science Cross-disciplinary Studies minor (DATA 301,401,451,452).
  - b. CalStateLA (By Jongwook Woo) has
    - i. CIS3200: Data Analysis, Data Science with Machine Learning
    - ii. CIS4560/CIS5200: Introduction to Big Data
      1. Big Data Engineering and Analysis
      2. Hadoop, Hive, Pig
      3. Cloud Computing: Oracle Cloud, AWS, IBM Cloud, Azure
    - iii. BUS5100: Introduction to Business Analytics
      1. General Concept of Data, Big Data, AI
      2. Data Analysis, Data Science, Deep Learning
      3. Case Studies, Labs,
      4. Talks by Invited Speakers
    - iv. CIS5560: Introduction to Big Data Science
      1. Big Data Science: Machine Learning
  - a. Classification, Regression, Recommendation, Clustering
  - b. Feature Engineering, Generalization, Visualization
    2. PySpark in Spark ML, Python
    3. Cloud Computing service for Spark :
  - . Oracle Cloud, AWS, IBM Cloud, Azure, Databricks
2. How to get UGs involved in your research when AI is more graduate level course material?
  - . At Cal Poly SLO, our undergraduates can also take graduate classes.
  - a. Many of our CSSE faculty work with undergraduate students in research projects. While they may not have the depth, they are around longer, and can work on a project for more than one Academic Year. And they may do the blended (4+1) program.
  - b. CalStateLA (By Jongwook Woo): Always welcome UG to join the research
3. What tools/frameworks do you use when teaching AI/ML/DL?
  - . At Cal Poly SLO we are mostly using Python and Jupyter Notebooks. I use SKLearn for more traditional machine learning tasks and Tensorflow and Keras for deep learning projects. But it can be really useful to have students implement methods from scratch in Numpy if you want them to understand the nuts and bolts of the algorithms. -Jonathan Ventura
  - a. CalStateLA (By Jongwook Woo) use Python and PySpark with Spark, Hadoop, Hive, Pig in Big Data clouds services of AWS, Azure, Oracle, IBM
4. If you have a separate AI and ML class, what is the distinction and/or overlap? What textbooks do you use?"
  - . At Cal Poly SLO, we use Russell & Norvig's "Artificial Intelligence - A Modern Approach" for the CSC 480 Intro to AI class. The class addresses multiple topics in AI over one or two weeks, and Machine Learning is one of them. We have a separate, new class, CSC 487 Deep Learning, and a few other classes in our Data Science minor that discuss related topics. The CSC 487 course has been taught only twice by different instructors, but I believe they both used "Deep Learning" by Ian Goodfellow, Yoshua Bengio and Aaron Courville as a resource.

5. The application of AI and Big Data in accounting?
  - . CalStateLA (By Jongwook Woo) is open to work with accounting but needs domain expertise in accounting, which means collaboration needed along.
6. How do you approach the ethical considerations regarding ML/AI particularly those related to ethnic/racial bias and how do you teach ethics to students?
  - . This is a great question. I try to challenge my students to think about these issues throughout my ML and computer vision courses. I assign readings and discussions with open-ended questions to encourage them to both have an understanding of the issues and think about how they might address them once they are on the job as an engineer. They can hopefully use what they have learned in their engineering ethics course to help them address these questions. In the future I would like to do more in terms of assembling case studies around ethics in ML so that students can consider what they might do in a similar situation. I also hope to incorporate actual programming assignments where they can see the effect of dataset/algorithmic bias, for example. -Jonathan Ventura, Cal Poly SLO
7. I would like to understand the feasibility of using AI to recognize acoustic patterns in spontaneous speech in individuals with speech disorders.
  - . There has been some work on applying techniques from computer vision like object detection and classification to the audio spectrogram to identify patterns. A lot of this work has been done for applications such as detecting animals in wildlife audio recordings. Perhaps something like that could be applicable to your problem as well. -Jonathan Ventura, Cal Poly SLO
8. How to get UGs involved in research using Machine Learning when there really isn't UG curriculum for it within engineering?
  - . CalStateLA (By Jongwook Woo): Information Systems has it in CIS3200 and CIS4560
9. Will there be AI application examples in construction?
  - . CalStateLA (By Jongwook Woo): There should be many. You may google it as follows: <https://www.google.com/search?q=machine+learning+in+construction>
10. How is the integration of AI/ML being incorporated into decision support? There seems to be an issue of trusting AI/ML to the point it seems to automatically override human decisions rather than augment them.
  - . CalStateLA (By Jongwook Woo): It is an issue of policy not technology. Human can lead it but only by referring to the predictions or insights generated by AI/ML.